

REMARKS

Applicants appreciate the Examiner's thorough review of the present application, and respectfully request reconsideration in light of the preceding amendments and the following remarks.

Claims 1-10, 26 are pending in the application. The non-elected claims have been cancelled without prejudice or disclaimer. The elected claims have been amended where appropriate to better define the claimed invention. No new matter has been introduced through the foregoing amendments.

The claim objections as well as the *35 U.S.C. 112, second paragraph* rejections are believed overcome in view of the above amendments.

The art rejections relying primarily on *Li et al.* are noted. Applicants respectfully submit that the claims as presented in this paper are patentable over the applied art of record for at least the following reasons.

As to **independent claims 1 and 2**, *Li et al.* do not fairly teach or suggest the original claim language that the "pilot subcarriers being reference for a mobile station to perform time synchronization, frequency synchronization, and cell search."

Applicants note the Office's reliance on paragraph 0082 of *Li et al.* for the claim feature. While the cited paragraph discloses that "pilot symbols can serve multiple purposes: time and frequency synchronization, channel estimation and signal-to-interference/noise (SINR) ratio measurement for cluster allocation," it fails to teach or disclose the claimed cell search. Therefore, *Li et al.* do not anticipate the independent claims as originally presented.

The reference also fails to teach or suggest the invention as currently defined in the amended independent claims. In particular, the amended independent claims now require that for

each symbol, both pilot subcarriers and traffic subcarriers are allocated. The claim feature finds support in at least FIG. 2 and the corresponding text in the specification where it is disclosed that for each downlink symbol, both pilot subcarriers 112 and traffic subcarriers 111 are allocated.

Li et al. do fairly teach or disclose the claim feature at issue. The reference, as applied in the Office Action, discloses in FIG. 2 the concept of pilot symbols. It is, however, unclear from the disclosure of *Li et al.* as to whether such pilot symbols include both pilot subcarriers and traffic subcarriers or not.

Further, the disclosure at paragraph 0101 of *Li et al.* reproduced herein below suggests the opposite, i.e., no traffic subcarriers are allocated to the *Li et al.* pilot symbols.

[0101] Pilot symbols serve an additional purpose in determining interference among the cells. Since the pilots of multiple cells are broadcast at the same time, they will interfere with each other (because they occupy the entire frequency band).... Thus, the structure of pilot symbols is such that it occupies the entire frequency band and causes collisions among different cells for use in detecting the worst case SINR in packet transmission systems. (emphasis added).

A person of ordinary skill in the art, considering the *Li et al.* disclosure that each pilot symbol covers/occupies the entire frequency bandwidth would conclude that no traffic subcarriers are allocated to the *Li et al.* pilot symbols.

Paragraphs 0042 further states that “[a]fter each pilot period, there are a predetermined number of data periods followed by another set of pilot symbols.” That is *Li et al.* suggest the separation of pilot periods (or symbols) from data/traffic periods (or symbols). Such separation is apparently occurs in time (i.e., pilot, data, pilot etc.). In contrast, since both pilot subcarriers and traffic subcarriers are allocated to each symbol in the instant application, pilot and traffic transmissions are separated in frequency, as clearly illustrated in FIG. 2 of the application as filed.

Applicants note that *Li et al.* also mention pilot subcarriers in FIG. 10. There is, however, no *enabling* disclosure in *Li et al.* as to whether multiple pilot subcarriers are allocated to each

symbol or not, and/or whether such pilot subcarriers may be used as reference for cell search or not.

The reference's disclosure of pilot subcarriers does not anticipate the claimed invention.

In summary, Applicants respectfully submit that while the *general* use of pilot signals in telecommunications is known in the art, the *specific* use of pilot subcarriers as recited in the independent claims is not. Withdrawal of the anticipatory rejections of claims 1-2 in view of the above is believed appropriate and therefore respectfully requested.

As to **independent claim 10**, *Dubuc* also fails to fairly teach or suggest the original claim language that the "pilot subcarriers ...are references for a mobile station to perform time synchronization, frequency synchronization, and cell search."

Applicants note the Office's reliance on FIG. 4 of *Dubuc* for the claim feature. While FIG. 4 and the related text, i.e., column 19 line 54 through column 20 line 2, of *Dubuc* appear to disclose phase/frequency synchronization (column 19 line 61) and channel estimation (column 19 line 67) However, the reference, like *Li et al.*, fails to teach or suggest the claimed cell search. Therefore, *Dubuc*, if properly combinable with *Smee*, would still fail to render obvious claim 10 as originally presented.

The reference also fails to teach or suggest the invention as currently defined in amended independent claim 10 which now requires that for each symbol, both pilot subcarriers and traffic subcarriers are allocated. *Dubuc* discloses in FIG. 6 that only two symbols in the entire frame include pilot signals, contrary to the claimed invention.

Withdrawal of the rejection of claim 10 in view of the above is believed appropriate and therefore respectfully requested.

The **dependent claims**, including any new claim(s), are considered patentable at least for the reason(s) advanced with respect to the respective independent claim(s).

As to **claim 3**, it appears that the Examiner intended to cite *Kleider* at the paragraph bridging columns 5-6 (rather than at column 6 line 59 through column 7 line 7 as indicated in the Office Action). The reference indeed discloses uneven spacing between pilot tones across the frequency range. Notwithstanding, *Kleider* is not combinable with *Li et al.* because the principles of using pilot signals in the two references are completely different. Specifically, as discussed above, *Li et al.* calls for distribution of pilot symbols in time, whereas *Kleider* suggests pilot distribution in frequency. A person of ordinary skill in the art noting such a major difference would not have been motivated to combine the references.

As to **claim 7**, Applicants respectfully submit that the applied references, especially *Smee*, do not teach or suggest at least the claimed equations which find support in paragraphs 0064-0065 of the *published* instant application.

Each of the rejections has been traversed/overcome. Accordingly, Applicants respectfully submit that all claims are now in condition for allowance. Early and favorable indication of allowance is courteously solicited.

The Examiner is invited to telephone the undersigned, Applicant's attorney of record, to facilitate advancement of the present application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,
LOWE HAUPTMAN HAM & BERNER, LLP

/Yoon S Ham/
Yoon S. Ham
Registration No. 45,307

Serial No. 10/577,034

USPTO Customer No. 22429
1700 Diagonal Road, Suite 310
Alexandria, VA 22314
(703) 684-1111
(703) 518-5499 Facsimile
Date: July 6, 2009
YSH/KL/jr